REMARKS

Applicants request favorable reconsideration and allowance of the subject application in view of the preceding amendments and the following remarks.

To place the application in better form, Applicants submit herewith a substitute specification, which includes a new abstract. For the Examiner's convenience, also provided is a marked-up copy of the original specification showing the portions thereof which are being changed. The substitute specification includes the same changes as are indicated in the marked-up copy. Applicants' undersigned attorney has reviewed the substitute specification and submits that the substitute specification contains no new matter.

Claims 15 and 16 are presented for consideration in lieu of claims 1-14, which have been canceled without prejudice or disclaimer. Each of claims 15 an 16 is independent. Support for these claims can be found in the original application, as filed. Accordingly, no new matter has been added.

Applicant requests favorable reconsideration and withdrawal of the rejections set forth in the above-noted Office Action.

Claim 1 was rejected under 35 U.S.C. § 112, first paragraph, as failing to satisfy the enablement requirement. Specifically, the Examiner asserted that the specification provides for use of the "concentric-circle model" as discussed on page 14, lines 15-20 of the specification, and not for the "eccentric model" recited in claim 1. Claim 1 having been canceled, this rejection has become moot and should be withdrawn. Such favorable indication is requested. Nevertheless, the Examiner's comments were taken into consideration when presenting new independent claims 15 and 16.

Claims 5 and 9 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. With regard to claim 5, the Examiner asserted that the recitation of "*the* wavelength of *a* surface plasmon polariton wave" is indefinite for not clearly reciting which of the plurality of waves of the plasmon polaritons has the greater pitch. With regard to claim 9, the recitation of "a step of preparing an exposure mask as recited in any one of claims 1-4" is indefinite, according to the Examiner, for the reason that none of claims 1-4 are method claims and do not recite any features for preparing an exposure mask. Claims 5 and 9 having been canceled without prejudice or disclaimer, this rejection has become moot and should be withdrawn. Such favorable indication is requested. Nevertheless, the Examiner's comments were taken into consideration when presenting new independent claims 15 and 16.

Turning now to the art rejection, claims 1-14 were rejected under 35 U.S.C. § 102(b) as being anticipated by the Alkaisi article. Applicants submit that the cited art does not teach or suggest many features of the present invention, as previously recited in these claims. Therefore, this rejection is respectfully traversed. Nevertheless, Applicants submit that independent claims 15 and 16, for example, as presented, amplify the distinctions between the present invention and the cited art.

In one aspect of the present invention, independent claim 15 recites a method of designing an exposure mask for exposing an image forming layer provided on a substrate, by use of near field light leaking from adjoining openings formed in a light blocking member. The method includes determining a width D of the openings and an opening interval of the openings to be formed in the light blocking member, in which a relation $D \leq (P-W-2T)$ is satisfied, where T is the height of a pattern to be produced by the image forming layer, W is the linewidth of the pattern and P is the pitch of the pattern, so that an electrical field distribution, adjacent to the

opening of the light blocking member as exposure light is projected on the light blocking member, is approximated to an electrical field model extending circularly concentric with an edge of the light blocking member at an image forming layer side as a center.

In another aspect of the present invention, independent claim 16 recites an exposure method of manufacturing an exposure mask for exposing an image forming layer provided on a substrate, by use of near field light leaking from adjoining openings formed in a blocking member. The method includes determining a width D of the openings and an opening interval of the openings to be formed in the light blocking member, and processing the light blocking member so as to obtain the width D and the opening interval, in which a relation $D \leq (P-W-2T)$ is satisfied, where T is the height of a pattern to be produced by the image forming layer, W is the linewidth of the pattern and P is the pitch of the pattern, so that an electrical field distribution, adjacent to the opening of the light blocking member as exposure light is projected on the light blocking member, is approximated to an electrical field model extending circularly concentric with an edge of the light blocking member at an image forming layer side as a center.

As set forth above, independent claims 15 and 16 recite, among other features, an arrangement in which an electrical field distribution, adjacent to the opening of the light blocking member as exposure light is projected on the light blocking member, is approximated to an electrical field model extending circularly concentric with an edge of the light blocking member at an image forming layer side as a center. This feature of Applicants' present invention is discussed in more detail in the subject specification on page 16, line 24, to page 17, line 8, and is shown in more detail in FIGS. 1 and 3, for example.

The present invention, as recited in independent claims 15 and 16, is based on a finding by the inventors that designing a near-field exposure mask to obtain a desired exposure pattern

requires complicated simulations using a variety of parameters, and, since it takes a long time to complete the simulations, designing of the mask is very complicated, so that the electrical field (near field), which is the source of the near-field light leaking from openings formed in a light blocking film as it is irradiated with the exposure light, can be approximated to an electrical field model extending circularly concentric around the edge of the light blocking member.

With regard to the concentric circle approximation, as is discussed in the subject specification on page 16, line 24, to page 17, line 8, the extension of the electrical field in the simulation result well matches a concentric-circle model in which it has substantially the same expansion in the direction of the film thickness of the light blocking member, as shown in FIG. 3 (that is, a downward in the sheet of FIG. 3), and in the direction parallel to the surface of the light blocking member (that is, in the direction horizontal in the sheet of FIG. 3).

On the basis of the finding of the approximation mentioned above, the inventors of the subject application have found that the width D of the openings of the light blocking member and the opening interval of the openings can be determined so as to satisfy a relationship $D \leq P\text{-}W\text{-}2T$, where T is the height of the exposure pattern to be formed in the image forming layer, W is the line width of the exposure pattern, P is the pitch of the pattern and D is the width of the openings. This assures that the width of the openings of the mask and the opening interval of the openings can be very easily determined, while taking into account the shape of the exposure pattern (height, line width and pitch) to be produced without making complicated simulations.

Applicants submit that the cited art does not teach or suggest such features of the present invention, as recited in the independent claims.

The Examiner relies on the Alkaisi article for teaching an exposure mask and a method of making the mask for forming an image on a photoresist on a substrate. The Examiner further

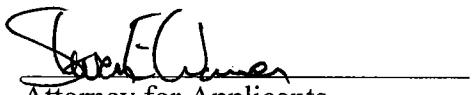
considers the Alkaisi article to teach a simulation and a model of the mask, based on the pitch and thickness of the medium to be imaged, in order to simulate and to model the diffraction in the evanescent near field of metallic gratings. Applicants submit, however, that the Alkaisi article does not teach or suggest anything regarding the concentric circle approximation or the condition $D \leq P\text{-}W\text{-}2T$, as in the present invention, as recited in independent claims 15 and 16. Applicants submit, therefore, that the Alkaisi article does not teach or suggest many features of Applicants' present invention, as recited in the independent claims. Accordingly, that article should not be read to anticipate or render obvious Applicants' present invention, as recited in those independent claims.

For the foregoing reasons, Applicants submit that the present invention, as recited in independent claims 15 and 16, is patentably defined over the cited art.

Applicants submit that the instant application is in condition for allowance. Applicants request favorable reconsideration, withdrawal of the rejections set forth in the above-noted Office Action and an early Notice of Allowance.

Applicants' undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should be directed to our address listed below.

Respectfully submitted,



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